

MONOLITHICALLY-INTEGRATED INFRARED SENSOR

Abstract of Disclosure

An integrated sensor comprising a thermopile transducer and signal processing circuitry that are combined on a single semiconductor substrate, such that the transducer output signal is sampled in close vicinity by the processing circuitry. The sensor comprises a frame formed of a semiconductor material that is not heavily doped, and with which a diaphragm is supported. The diaphragm has a first surface for receiving thermal (e.g., infrared) radiation, and comprises multiple layers that include a sensing layer containing at least a pair of interlaced thermopiles. Each thermopile comprises a sequence of thermocouples, each thermocouple comprising dissimilar electrically-resistive materials that define hot junctions located on the diaphragm and cold junctions located on the frame. The signal processing circuitry is located on the frame and electrically interconnected with the thermopiles. The thermopiles are interlaced so that the output of one of the thermopiles increases with increasing temperature difference between the hot and cold junctions thereof, while the output of the second thermopile decreases with increasing temperature difference between its hot and cold junctions.